

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph that begins on page 4, line 10, with the following amended paragraph:

FIGS. ~~5A-B~~ 5A and 5B show example flow diagrams of other embodiments of the steps of measuring disk drive performance according to the present invention;

Please replace the paragraph that begins on page 4, line 12, with the following amended paragraph:

FIGS. 6A and 6B, together, show ~~shows~~ a functional diagram of another example embodiment of the steps of measuring disk drive performance according to steps FIGS.

5A and 5B ~~5A-B~~;

Please replace the paragraph that begins on page 4, line 16, with the following amended paragraph:

FIGS. 8A and 8B, together, show ~~shows~~ example parameter specifications for different example access patterns for measuring/testing performance of a disk drive;

Please replace the paragraph that begins on page 12, line 9, with the following amended paragraph:

FIGS. 6A and 6B, together, show ~~shows~~ a functional/flow diagram of steps in FIGS. 5A-5B, of measuring disk drive performance according to an embodiment of the present invention, that can be implemented as a test module 24 (e.g., test software

program) in the system 22 (FIG. 2). One or more data access patterns and one or more host data transfer rates 80 (e.g., Data Rate #1 ... #N) are specified e.g. by a user for the disk drive read/write operations (step 81) in the module 24. Each access pattern includes a set of data transfer operations for one or more data streams at one or more locations on concentric data tracks on at least one disk in the disk drive 14.

Please replace the paragraph that begins on page 15, line 4, with the following amended paragraph:

Referring to FIG. 7 in conjunction with FIGS. 6A and 6B, in an example operation scenario, a set of host data transfer rates 80, and a set of values defining one or more access patterns are provided to the test software module 24, implemented in the test system 22, as user script inputs (step 110). As detailed above, the access pattern values specify e.g. where and how much data is accessed in the disk drive 14 according to each access pattern test. For example, there can be three basic types of access patterns: sequential access, dual stream access and multiple random access. An unlimited number of access patterns can be contemplated and tested, however said three basic access patterns can adequately cover the majority of data streaming applications.

Please replace the paragraph that begins on page 17, line 20, with the following amended paragraph:

The time interval T is used in a virtual buffer size determination method/model, described above e.g. in relation to FIGS. 6A, 6B and 7, 6-7, and reflects the time from command issued to command complete. Each time the test software module 24 measures

the time T for a read/write command, that time T is then used to calculate virtual buffer size requirements for desirable data streaming. Referring back to FIGS. 6A and 6B, the module 24 performs a complete loop (e.g., steps 88, 94, 102, 104, 106, 108 in FIGS. 6A and 6B) for each command execution time T before issuing the next read/write command, measuring the command completion time, and determining adjusted virtual buffer size for each data transfer rate. In one example operation, the time T for performing a read/write command is measured and then multiplied by the multiple user/required data transfer rates 80. Each multiplication result is the number of bits demanded by the corresponding data transfer rate 80 in the amount of time, T. The actual number of bits transferred 90, as specified by the read/write command, to/from the disk drive is then subtracted from each said multiplication result to determine a difference as the virtual buffer size value increment/decrement 92 for each data transfer rate 80. For a first data transfer in an access pattern, the value 92 is the initial virtual buffer size value 96.

Please replace the paragraph that begins on page 19, line 10, with the following amended paragraph:

Referring back to FIGS. 6A and 6B, as subsequent read/write commands are executed, then the virtual buffer size value 96 is continually updated for each data transfer rate 80. Any virtual buffer size values that are negative in value are then reset to zero as negative buffer size values are meaningless and simply signify that the disk drive is performing adequately for that data transfer rate 80. Thereafter, data logging steps are performed as each time command completion time T and updated virtual buffer size value per data transfer rate is determined. For example, maxima, minima, standard

deviation, or histogram bins are calculated and logged for posting in a results file.

Further, statistics regarding the raw time measurements, T, can also be calculated and logged as they are measured.

Please replace the paragraph that begins on page 19, line 21, with the following amended paragraph:

FIGS. 8A and 8B, together, show shows example parameter specifications in Table 1 for different example access patterns for measuring/testing performance of a disk drive 14. Table 1 provides three specific access patterns for each of each of the three Sequential, Dual-Stream, and Random test streams. Relevant stream parameters are specified, including for example: (1) Access pattern or test stream type (e.g., sequential access, dual stream access and multiple random access); (2) test time, specifying the amount of time that a particular access pattern test runs and is based on the specific drive being tested; (3) transfer operation (e.g., write (Wrt.) or read (Rd.)); (4) silent seek, specifying a parameter which can be set on some disk drives to control seek noise; (5) cache setting, specifying whether or not the disk drive will attempt to string together contiguous transfer commands greater than the single command size allowance (e.g., 256 sectors for AT type disk drive) into one large transfer, thus maximizing the bandwidth of the disk drive (e.g., accomplished in AT type disk drive by a relatively small amount of RAM onboard the disk drive); (6) number of blocks per transfer operation/command (nb); (7) total transfers, specifying the total number of commands in each access pattern test, wherein for an access pattern, total transfers multiplied by the sectors per transfer (blocks per transfer) multiplied by the number of bits per sector (e.g., 4096) provides the

total bits transferred according to that access pattern; (8) Stream 1 start, specifying the location in the disk drive of the first sector to be transferred for that access pattern; (9) Stream 2 start, applies only to the dual stream mode and specifies the location of the first sector relative to the 2nd stream location in the disk drive to be transferred for that access pattern; and (10) hosts data test rates (TR) (e.g., megabits per second (Mbps)) to test against.